Hardy Hydroelectric Plant,
Substation
6928 East 36th Street
Newaygo Vicinity
Newaygo County
Michigan

HAER No. MI-100-C

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
United States Department of the Interior
National Park Service
Great Lakes Systems Office
1709 Jackson Street
Omaha, Nebraska 68102-2571

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HISTORIC AMERICAN ENGINEERING RECORD

HARDY HYDROELECTRIC PLANT, Substation

HAER No. MI-100-C

Location: 6928 East 36th Street
Newaygo Vicinity
Newaygo County
Michigan

UTM: 16:610830:4815530
Quad: Croton

Dates of Construction: 1930-1931

Engineers: Edward M. Burd, head of civil and hydraulic engineering for Consumers Power Company, Jackson, Michigan

Present Owner: Consumers Energy Company (formerly Consumers Power Company), Jackson, Michigan

Present Use: Substation at hydroelcctric generating plant

Significance: The Substation is part of thc Hardy Hydroelectric Plant, built in the early 1930s as a link in Consumers Powcr Company's system of electric power generation. In designing and building Hardy, the company found a way to erect a stable, relatively high dam on Michigan's notoriously gravelly foundations, continuing its tradition of developing solutions to the problems presented by Michigan's geography and geology. The design process for the dam also appears to reflect a tendency in American civil engineering to favor regional practices over technology developed elsewhere.

Project Information: This documentation was prepared by Consumers Power Company (CPCo) in conformance with its Cultural Resources Management Plan for the Muskegon River Hydroelectric Projects (July 1995). The plan stipulated the recordation of the entire Hardy Hydroelectric Plant (according to the standards of the Historic American Engineering Record). The documentation was completed in 1997 by Hess, Roise and Company of Minneapolis under contract with CPCo. Cynthia de Miranda served as Project Historian under the supervision of Principal Investigator Jeffrey A. Hess. Project photography was completed under a subcontract with Hcss Roise by Clayton B. Fraser of Loveland, Colorado.

PHYSICAL DESCRIPTION

Hardy Hydroelectric Plant's (HAER No. MI-100) outdoor Substation stands on a poured concrete slab immediately north of the Powerhouse (HAER No. MI-100-B). Measuring approximately 51' x 132', the Substation yard is bordered on the west by chain-link fencing, on the south by the Powerhouse, and on the north and east by concrete retaining walls. Short metal towers stand atop the retaining wall opposite the Powerhouse, supporting the upstream ends of several steel girders that reach across the yard to the roof of the Powerhouse. Transmission lines are suspended from the girders with insulator strings, which prevent current from electrifying metal structural parts.[1]

At the yard's far east end, a bank of three Allis Chalmers transformers, immediately north of the switch-room wing of the Powerhouse, steps up the generated current of 7,500 volts to 140,000 volts before sending power down the transmission line. Adjacent to the main transformer bank is a smaller group of three transformers that step the current down to 480 volts for use at the plant. Low-voltage switchgear is sheltered in a 16'-0" x 18'-0" metal shed just west of the transformers. On the west end of the yard, three arresters protect the system from lightening. From the Substation, the transmission line is carried west to Croton Substation on four-post metal towers.

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[1] All directions are given in full cardinal points for the sake of clarity. This description is based on a site survey conducted by the authors on 24 July 1995; on an updated version of Allied Engineers "General Layout and Sections: Hardy Dam," Drawing M64-G4 (Rev. 15), 23 September 1984, at Hydro Operations, Consumers Power Company, Cadillac, Michigan; on H.N. Fox, "Electrical Features at Hardy Dam," *Au Sable News* (August 1931): 9-10, 32-33; and on "Hardy Dam Goes on the Line," *Electrical World* 79 (27 February 1932): 413.

HISTORY

Allied Engineers, a subsidiary of Consumers Power Company, erected the Substation concurrently with the Powerhouse (HAER No. MI-100-B) during autumn and winter 1930. When the plant went into operation in April 1931, the generated current was stepped from 7,500 to 140,000 volts in the Substation, then transmitted to the Croton Substation six miles downstream. From Croton, power was distributed to the Grand Rapids and Muskegon areas. Hardy continues to supply peak power at 140kv through the Croton Substation.[2]

A 1960 explosion in the switching gear caused considerable damage to the Powerhouse, as well as to equipment in the Substation. The main transformers managed to escape damage, but the station-power transformers were blown out of place. The company replaced the smaller transformer bank and enclosed some low-voltage switching gear in a metal shed placed west of the Powerhouse wing.[3]

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[2] Fox, 32; Consumers Power Company, "Application for New License for Major Project-Existing Dam, Hardy Project, FERC Project No. 2452, Exhibit A: Description of Site," December, 1991, Hydro Operations, Consumers Power Company, Cadillac, Michigan.

[3] E.D. Schantz, Consumers Power Company, Grand Rapids, Michigan, to E.H. Kaiser, Consumers Power Company, Jackson, Michigan, 20 October 1960, in the Hardy Hydro Plant files, Miscellaneous Folder III, Hydro Operations, Consumers Power Company, Cadillac, Michigan.

SOURCES OF INFORMATION

ENGINEERING DRAWINGS

Allied Engineers. "General Layout and Sections: Hardy Dam." Drawing M64-G4 (Rev. 15), 23 September 1984. Hydro Operations, Consumers Power Company, Cadillac, Michigan.

HISTORICAL VIEWS

Hardy Hydroelectric Plant construction photographs. Hardy Hydroelectric Plant, Muskegon River, Michigan.

PUBLISHED SOURCES

Fox, H.N. "Electrical Features at Hardy Dam." *Au Sable News* (August 1931): 9-10, 32-33.

"Hardy Dam Goes on the Line." *Electrical World* 79 (27 February 1932): 412-413.

Plumb, H.J. "Hardy Dam-Grand Rapids Transmission Line." *Au Sable News* (August 1931): 15-16, 35-36.

ARCHIVAL COLLECTIONS

Hardy Hydro Plant files. Miscellaneous Folder III, Hydro Operations, Consumers Power Company, Cadillac, Michigan.